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The Psychology of Financial Markets

A Study on Nonrational Trading by Market Participants

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Table of Contents

List of Figures	4
Glossary	5
1 Introduction	6
1.1 Why Do We Invest?	6
1.2 Seeking New Standards	8
2 Deficient Theories and Hypotheses	10
2.1 Commonly Taught Theories	11
2.1.1 The Efficient Market Hypothesis	11
2.1.2 Random Walk Theory	14
2.1.3 Modern Portfolio Theory	17
2.1.4 Rejection of the CAPM	19
2.2 Inadequate Predictive Models	20
2.2.1 Problem with Long Term Predictions	20
2.2.2 Critique on Technical Analysis	22
3 A History of Irrationality	23
3.1 Famous Popular Delusions	25
3.1.1 Market Crash of 1987	25
3.1.2 Long-Term Capital Management	29
3.1.3 Internet Mania of the New Economy	31
3.2 Unavoidable Boom & Bust Cycles	33
4 Examining Individual and Crowd Behavior	35
4.1 Arguments Against Individual Rationality	36
4.1.1 Uncertainty Environments and the Asch Experiment	36
4.1.2 Basic Financial Choices	38
4.1.3 Fallacious Appeal to Authority	39
4.2 Crowd Psychology	41
4.2.1 The Mind and Herding of Crowds	41

4.2.2	Smarter Than the Individual	43
4.2.3	Even Experts Follow the Crowd	44
4.3	Handling the Future	46
4.3.1	Why Do We Predict?	46
4.3.2	Economists are Useless at Forecasting	48
4.3.3	Biased Assimilation	50
5	Appropriate Market Models	52
5.1	Behavioral Finance	54
5.1.1	Market Sentiment Analysis	54
5.1.2	Prospect Theory	56
5.1.3	Genetic Loss-Aversion	58
5.2	Adaptive Markets Hypothesis	59
5.3	Theory of Reflexivity	62
	Conclusion	64
	References	68
	Eidesstattliche Erklärung	72

List of Figures

1.	Histogram of standardized S&P 500 weekly returns (1998–2008)	15
2.	Waves according to the Elliott Wave Principle	17
3.	CAPM showing the Security Market Line	20
4.	Historical performance of the DJIA since inception in 1896	25
5.	Chart of the 1987 market crash	26
6.	20 year chart of the volatility index (1990-2010)	30
7.	Quarterly closing prices of Internet Capital Group	32
8.	Comparison lines used in the Asch Experiment	37
9.	Percentage answers in financial literacy survey	38
10.	Bull/Bear index calculated by Cognitrend	45
11.	Survey of Manager Sentiment	46
12.	Comparison chart of GDP forecasts to actual results	49
13.	Historical earnings expectations for S&P 500 companies	50

Glossary

Arbitrage Trading: Refers to the practice of taking advantage of a price difference between two or more markets, striking a combination of matching deals that capitalize upon the imbalance. The profit is the difference between the market prices.

Benchmark: A standard against which the fund manager's portfolio performance can be compared. Usually the relevant stock index is used.

Beta: Measures statistical variance of an asset in relation to the overall market. A beta β of 0 means that there is no correlation with the market. A positive β suggests that the asset generally follows the market, while a negative β suggests that it follows inversely.

Leverage: Common technique to multiply gains and losses by buying fixed or financial assets (such as derivatives) with borrowed money. The most common household usage of leverage is to buy property through mortgage.

Option (put & call): The buyer of the contract acquires the right, but not the obligation, to transact the underlying asset which the seller must fulfill. The right to buy is called "call" and the right to sell is called "put".

1 Introduction

1.1 Why Do We Invest?

When it comes to putting investments to work in the financial market, all participants have the common goal to make money in the shortest amount of time. The market participant is therefore being confronted with the question of what to invest in and at the same time how not to lose out in comparison to other investment opportunities that are currently at hand (while minding opportunity costs). Soon enough one will realize that the future is undefined and in fact highly unpredictable. Making investment decisions can be challenging indeed. Professional dancer, Nicolas Darvas who ventured into stock trading and attained great success with it, described the dilemma best,

“Looking back I could see this very clearly. I could see exactly why the stock had performed the way it did – afterwards. The question, however, was: How to judge a movement at the time it happens? It was a simple, straightforward problem, but it was complex in its enormity. I already knew that book systems did not help, balance sheets were useless, information was suspect and wrong.”¹

Having completed an internship with Deutsche Börse AG that has regular contact to both retail and institutional investors, I could notice the retail’s lack of expertise about financial instruments. Both the retail and institutional investors are moving in a sphere of tremendous lack of knowledge which must naturally lead to a herding effect. James Montier, a member of GMO’s asset allocation team, warns that this environment gives rise to the species “*homo ovinus*” only concerned with where it stands relative to the crowd.² Due to this competitive environment, it must be inherently impossible for all market participants to trade rationally because of constant relative gauging and

¹ Darvas: How I Made \$2,000,000 in the Stock Market, pp. 50–51

² Montier: Value Investing, p. 8

comparing with the peers. Business schools, however, teach their students that they have to assume an underlying perfect market where all participants act rationally according to a *homo oeconomicus* and make efficient decisions based on absolute information. In belief of efficient markets where outperformance is impossible, forecasting has become a profession taken too seriously. A majority of the financial industry's business is about forecasting because the future is traded based on present and past information. The investment community therefore has an utmost interest in knowing price movements in advance and consult experts in this field, who will not know better either (although they claim otherwise). The fact is that one simply does not have perfect information and yet many make efforts in developing predictive models with the objective to quantify precise scenarios of the future, only to miss it by a great margin more often than not. Human beings cannot easily deal with the unknown.

Out of this precondition we have to conclude that all investment activities are speculations, a bet on a future outcome. Speculations are basically attempts to beat time. When the investor wants to earn more than what his savings generate in interest, sells out near the top of a bull market, or when doing active in-and-out trading, he is actually trying to save time. The minimum objective is to beat inflation, an ubiquity in today's macroeconomic environment. In the short-term, one has the desire to pay for daily expenditures, and in the long run, one wishes to attain a better living standard. Adam Smith who is a pioneer of political economics already asserted in his work 'The Theory of Moral Sentiments' that human beings have a relentless pursuit for wealth and recognition, in other words, for material and immaterial values.³ The driving force of the economy is the desire to improve one's situation. Smith tried to show in his later principal work 'The Wealth of Nations' that the egoistic man serves the well-being of the whole through his economic actions. In today's ethical philosophy this is known as *rational selfishness*. Smith's metaphor of the "invisible hand" of the market which

³ Smith: The Theory of Moral Sentiments, p. 291

unites all individual interests and creates largest possible corporate good⁴ is a common concept until today. Nowhere else than in financial markets can this invisible hand be better and immediately observed.

Market participants have different approaches when putting money to work due to their individual needs. The market is therefore an aggregate of all needs combined where an equilibrium consensus is found. This in turn must contribute to a noticeable psychology-driven market. On an individual basis, we have to assume that this environment will ultimately spur nonrational decision-making.

1.2 Seeking New Standards

Throughout history we have been repeatedly shown that markets are a sequence of booms and busts. At the turn of the millennium it was the internet bubble which burst. In 2008, the housing bubble shared the same fate and pushed the financial system to the brink of disaster. Predictive models such as *fundamental analysis* or *technical analysis* cannot quite grasp the multifactorial happening in financial markets. The following chapter presents models that are now increasingly criticized and brings up arguments for and against the underlying theories and techniques. It is followed by a chapter that will reveal some of the most popular delusions in recent financial history. These phenomena will invalidate the traditional belief of an objectively thinking man and justify the price with the underlying market sentiment at a given time. Contrary to what is generally assumed, I want to assert with the help of game theory that market participants cannot act perfectly rational due to their individual behavioral biases. I will examine behavior and why certain financial decisions are made, to demonstrate that the perfect market – as proclaimed by the theories for efficient markets – needs additional factors to reflect the dynamic reality.

⁴ Smith: The Wealth of Nations, p. 399

This thesis will then proceed with proposing market models that take crowd psychology and human interaction into consideration. It will discuss theories from well-known economists and real-world speculators which have been unduly disregarded in favor of the *Efficient Market Hypothesis* taught in business schools.

2 Deficient Theories and Hypotheses

To understand market prices, academics of the financial industry have devised models that seek perfection. It derives from a desire to find the best formula to interpret every market movement and also find the “rational” price expected in the future. A market is regarded as efficient if it reflects fundamentally justified prices at every moment. Normally, it equals the discounted future cash flow attained through the investment. The price also discounts all pieces of information that are publicly available (*information efficiency*).⁵ This chapter examines the practical relevance of commonly taught theories with regards to rationality and offer pro and contra arguments discussed in the industry.

One name is often associated with the theory of efficient markets: Eugene Francis Fama, an American economist best known for his work on portfolio theory and asset pricing. In today’s business schools, his ideas are still dominant in explaining the perceived reality of financial markets. It has a contradictory flavor in it because the more efficient markets are, the more unpredictable they will become. Fama concluded in his Ph.D. thesis that stock prices follow a so-called “random walk.”⁶ The unpredictability of day-to-day market movements is commonly used against the usefulness of *fundamental analysis* and *technical analysis* which is why the *Modern Portfolio Theory* emerged to suggest asset allocations that promise to give the most desirable outcome to the average investor.

⁵ Krämer: Kapitalmarkteffizienz, p. 1267

⁶ Fama: The Journal of Business, p. 34

2.1 Commonly Taught Theories

2.1.1 The Efficient Market Hypothesis

It is widely believed that financial markets are efficient in reflecting information about individual stocks and about the stock market as a whole. When new information emerges, it would be instantly incorporated into the valuation of securities. Thus, arbitrage trades are nearly impossible due to competition among numerous participants involved in the market who have already discounted the information in the price.

“Economists who believe in efficiency do so because we view markets as amazingly successful devices for reflecting new information rapidly and, for the most part, accurately. Above all, we believe that financial markets are efficient because they don’t allow investors to earn above-average risk-adjusted returns.”⁷

Neither *fundamental analysis*, which analyses a company’s financials, nor *technical analysis*, which seeks patterns in historical price movements, would allow an investor to attain greater returns than a portfolio with randomly picked stocks with similar risk. This reminds of an old joke about the economist and his friend walking along the street. The friend points to a \$100 bill on the pavement. The economist says, “Don’t bother. If it’s real, someone would have picked it up already.” The *Efficient Market Hypothesis* according to Fama assumes three levels of efficiency:⁸

1. **Strong efficiency:** Prices instantly reflect all relevant public, non-public, and insider information, offering no arbitrage opportunities whatsoever.
2. **Semi-strong efficiency:** Relevant public information is discounted in the price.
3. **Weak efficiency:** Merely the information based on historical price action is reflected in the price.

⁷ Malkiel: The Efficient Market Hypothesis and Its Critics, p. 5

⁸ Krämer: Kapitalmarkteffizienz, p. 1269

According to one of the six tenets of the *Dow Theory*, named after Charles H. Dow who is best known for his Dow Jones Industrial Average (DJIA) stock index, it is stated that indices discount everything. They constantly mirror every piece of information and represent a genuine picture of market events. In this respect, the *Dow Theory* may comply with strong efficiency of the *Efficient Market Hypothesis*.

If investors cannot outperform the market with active management, the reason of attempts and effort made by market participants and the entire fund industry should be doubted. In response to this justified criticism, proponents of the hypothesis offer two main reasons for outperformance:

- Insider information which is obviously illegal
- Forecast the future better than the rest

This has sent the financial industry on a wild attempt to best predict the future. The favorite forecasting tool of economists and investors is to extend current conditions and recent trends in a straight line into the future. Although prices can move very fast, they still adjust gradually while overreacting and creating trends along the way because market participants get compulsive. Information flows into the market constantly and this the reason why Christoph Boschan, managing director at Baden-Wuerttembergische Wertpapierboerse, calls the financial market a multifactorial happening that cannot be forecast due to its strong dynamics and external influences. According to Boschan, no one controls this multifactorial happening. To support his case, he gives the example of the market crash in 1929, whereby wealthy bankers bought shares in an attempt to calm the public and support share prices from falling. This served more a psychological than an economic purpose as the market embarked on a steady slide until 1932. History therefore proves that no individual market participant can outsmart or control the market even though extremely wealthy.

The idea of reactive trading, where participants compete with each other to take prices far higher or lower, is also neglected in the *Efficient Market Hypothesis*. In this context, Benjamin Graham, economist and professional investor, suggested in 1965 that while the stock market in the short run may be a voting machine, it will be a weighing machine in the long run.⁹ The differences between short term trading on emotions or reason (the voting machine) and long-term value creation (the weighing machine) was also explained. The *intrinsic value* will be reflected in the security's price eventually. As market participants are confronted with these statements about financial markets, one doubts the validity of the hypothesis that information was being accurately reflected in price without any delay. According to Graham, the market will discount all information over time but investors can still harness inefficiencies. This is also very logical because:

- Market participants need to digest all incoming information until a new equilibrium is found.
- Prices will then wiggle seemingly “randomly” (*Random Walk Theory*) up and down this fair price (fundamentally justified) until new information disrupts the equilibrium to a certain extent.

Prices may fall because market participants came to the conclusion that its high levels are not justified in light of the future prospects and take some risks off the table. Similarly, they can come to the conclusion that low levels are not correctly showing the potentials ahead and increase their risk exposure accordingly. In aggregate, this will result in prices adjusting themselves to a trend that is regarded as the equilibrium.

In my interview on behalf of Deutsche Börse AG on July 28, 2010 with Hendrik Leber, fund manager at Acatis Investment GmbH and an advocate of Graham's teachings, he said that he does not support the idea of an efficient market. The theory does not make

⁹ Graham: *Security Analysis*, p. 28

sense to him because he figures that it is possible to find share prices which do not reflect the true fundamental value of its company and recommends not to succumb to irrational decision-making when markets are nervous. Instead, he advises to exploit such opportunity and take it as advantage since one gets to buy at a lower price. It is like seeing a product on sale in the supermarket. The consumer is very inclined to buy at a bargain which the investor paradoxically is not.

Two market participants can come to different conclusions, based on the same information at the same time. This arises out of the *Subjective Theory of Value*. “The measure of value is entirely subjective in nature, and for this reason a good can have great value to one economizing individual, little value to another.”¹⁰ The direction of price movements must therefore result from the *sum of the decisions* made, not from the sum of information. Markets are highly complex dynamical systems that are prone to chaos. The assumption that the aggregate of these decisions is efficient would imply that the decision-makers as a whole are efficient. Even though this can be true to some extent, human beings are inefficient decision-makers in a chaotic system.

2.1.2 Random Walk Theory

In an attempt to explain the day-to-day price movements, Eugene Francis Fama memorably dubbed the wiggles a “*random walk*”, which suggests a price sequence where subsequent price changes have no relation to the previous price (such as the previous day’s closing price of the same security). Burton Malkiel, who is an economist and writer, is a strong advocate for the *Efficient Market Hypothesis*. He propagated the idea of a random walk in his book ‘A Random Walk Down Wall Street’. The *Random Walk Theory* typically applies to short-term movements and was espoused in 1900 by Louis Bachelier, a French mathematician, who compared the unpredictable movements

¹⁰ Menger: Principles of Economics, p. 146

of market prices to the unpredictable walk of a drunk.¹¹ In other words, information is immediately reflected in stock prices. If there is different news tomorrow, it too will be reflected therein and is independent of the previous information. Since such information is unpredictable for the general public, stock prices must be unpredictable, too. Bachelier attempted to formulate a mathematical theory for price movements, however, he concluded was that there is no way to know. When tracking the changes of a share price over many intervals, the changes would fall onto a bell-curve with the climax with minimal change being most likely (figure 1). As seen from the bell-curve, large price changes are rare. It comes down to a matter of probabilities.

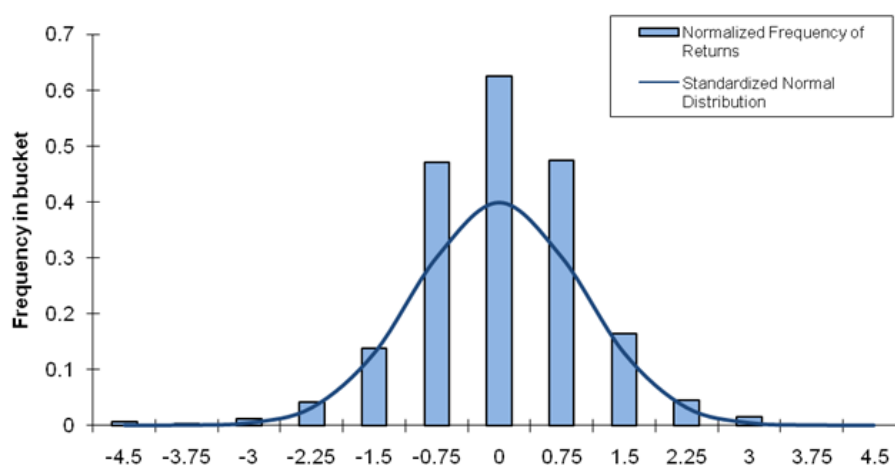


Figure 1. Histogram of standardized S&P 500 weekly returns (1998–2008)

Source: <http://www.quantmonitor.com/in-search-of-black-swans-a-statistical-look-at-the-weekly-sp-500>

Malkiel's assertion therefore is that a blindfolded chimpanzee throwing darts at the *Wall Street Journal* could select a portfolio that performs just as well as any professional fund manager.¹² In practice, he suggested to simply buy an index fund in order to replicate the general market's performance and lessen the expense that an actively managed fund would demand. Walter Krämer, professor for Statistics at the University of Dortmund, conducted exactly this experiment with seven of his students. Each student threw ten darts on the stock listing of a newspaper to create a portfolio of ten

¹¹ Bachelier: *Theorie de la Spéculation*, p. 31

¹² Malkiel: *A Random Walk Down Wall Street*, p. 14

randomly selected stocks. After five months, the performance was compared to that of an industry's portfolio of supposedly carefully analyzed stocks. Five student's portfolios performed better and two performed slightly worse.¹³ Krämer's experiment can indicate that there is some truth in Malkiel's assertion and that there is no magic in the fund managing industry.

Ralph Nelson Elliott, accountant and author, tried to prove that market movements do follow a predictable pattern. His study of stock market data revealed that markets move in repeated manners which practitioners call the *Elliott Wave Principle*. It is a form of *technical analysis* that tries to identify crowd psychology by forecasting trends and to what extent each wave is going to reach. Assuming that the market's mood swings from optimism to pessimism and back again, repeated patterns are created along the way (figure 2). "It's as though we are somehow programmed by mathematics. Seashell, galaxy, snowflake or human: we're all bound by the same order."¹⁴ The patterns meet the definition of fractal geometry as mathematician Benoît Mandelbrot once described. A characteristic of the *Chaos Theory* is that they exhibit a similar pattern over several time frames (*self-similarity*). It argues that short-term randomness seen in the bigger picture can create a sense of stability and structure.¹⁵

¹³ Geld & Leben

¹⁴ Casti: New Scientist, p. 29

¹⁵ Peters: Fractal Market Analysis, p. 11

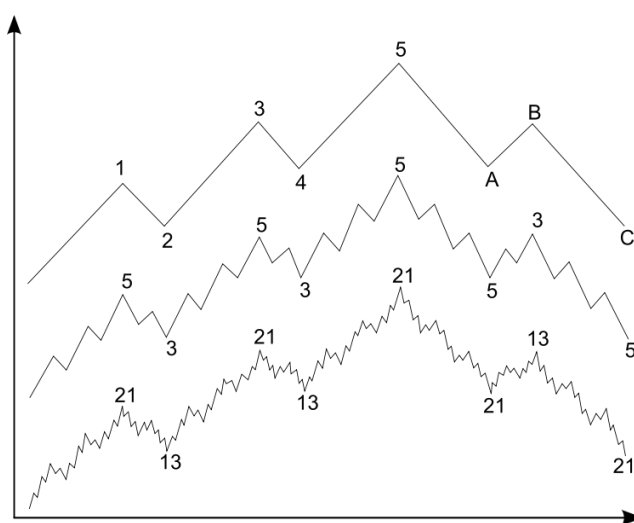


Figure 2. Source: R. N. Elliott, “The Basis of the Wave Principle” (October 1940)

Practitioners know that crowd psychology evolves in natural patterns through buying and selling decisions that are reflected in market prices. Mandelbrot himself is skeptical toward this analytical approach in predicting markets, “Wave prediction is a very uncertain business. It is an art to which the subjective judgement of the chartists matters more than the objective, replicable verdict of the numbers. The record of this, as of most technical analysis, is at best mixed.”¹⁶

2.1.3 Modern Portfolio Theory

Models built on a Gaussian distribution by Harry Markowitz, professor of finance at the University of California, and William Sharpe, professor of finance at Stanford University (both recipients of the Nobel Prize in Economics) contributed to what is called the *Modern Portfolio Theory*. To compose an ideal portfolio for every individual’s risk appetite, it seeks to maximize return and emphasizes that higher return must inherently come with higher risk. With the knowledge that even a professionally managed portfolio generally does not outperform the market, its focus lies in distributing the assets among different asset classes. A simple portfolio construction

¹⁶ Mandelbrot; Hudson: *The (Mis)Behavior of Markets*, p. 245

could be an allocation between stocks and bonds. If stocks are not performing well, bond prices generally tend to increase and thus contribute to an overall reduced risk exposure. A few statistical terms such as *standard deviation*, *correlation*, or the *Sharpe ratio* come to mind when referring to this theory. If one opens a fund prospectus or flips through key data of a trading system's risks, these figures will appear as the numbers that represent the expected risk and volatility in the future. They are based on a bell-curve that regards unexpected and unknown risks as extremely unlikely. However, history shows that turmoils are not so rare after all and neglecting them is irresponsible ignorance. By having those numbers at hand, a consultant or sell-side broker relies on these numbers and if there is a problem, they can claim that they trusted scientific methods. So no one seems to be at fault if clients lose money.

Empiric observations could not prevent this theory from spreading simply because contagion determines the acceptance of a theory in social science. Although it is now widely used in the financial industry, its assumptions are being challenged by proponents of behavioral economics because it is again based on the belief that investors are rational and markets are efficient. Utmost requirement for this theory to work is that the parameters of an asset such as correlation, expected return, or standard deviation do not change during the investment period.¹⁷ Despite its theoretical significance, seeing the market through mathematical spectacles comes with several flaws because it does not match the real market in several ways:

- **Correlations do change:** When markets crash during times of financial crises, the once negatively correlated assets are suddenly positively correlated.¹⁸ If forced liquidation is among investor's agendas, all markets tend to move in the same direction (usually down). Investors are severely damaged exactly when they are in need of protection which renders asset allocation worthless.

¹⁷ Bissantz; Steinorth; Ziggel: Stabilität von Diversifikationseffekten im Markowitz-Modell, p. 6

¹⁸ Longin; Solnik: Is the correlation in international equity returns constant: 1960-1990?, p. 6

- **Market participants act nonrationally:** A key assumption of the theory for efficient markets is that all investors aim to maximize economic utility.
- **Not all market participants are risk-averse:** It contradicts with the real behavior of investors who will readily and subconsciously take more risks despite lower returns. To avoid a loss, they will strongly prefer risk because potential losses have a higher impact than returns (*Loss-Aversion*).

2.1.4 Rejection of the CAPM

The perhaps grandest theory for risk and return is the *Capital Asset Pricing Model*, or *CAPM*. It allows us to determine the theoretically appropriate rate of return. It was developed independently by William Sharpe, John Lintner, and Jan Mossin in the 1960's and is based on the *Modern Portfolio Theory* by Harry Markowitz. The model divides the portfolio into risk-less interest and the market return. Accordingly, the expected return μ of a security has the following formula:

$$\mu_i = r_f + \beta_i (\mu_m - r_f)$$

where

- r_f is the risk-less interest
- β_i the volatility expressed in beta
- μ_m the expected return of the combined portfolio

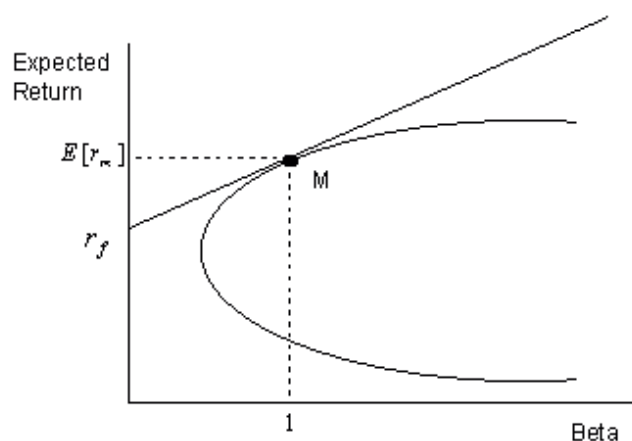


Figure 3. CAPM showing the Security Market Line

A priori, the formula suggests that higher market returns come only with higher volatility. A serious flaw of this formula is how it defines risk. *CAPM* considers the beta as risk while it actually measures price variability. The input is all too often a calculation over short periods of time, usually one year in the case of beta and historical standard deviations are never able to capture future risks. At most they can indicate a security's characteristic. When catastrophes such as the global financial crisis hit capital markets, historical standard deviations are unable to offer proper risk management techniques. Consequently, the *CAPM* which is a commonly used tool for assessing risk in the industry, should be regarded as obsolete. It is accepted that risk management models need to change.

2.2 Inadequate Predictive Models

2.2.1 Problem with Long Term Predictions

When dealing with financial markets, predictions for securities prices are particularly in demand to make the most money in the least amount of time. If predictions did not exist, market participants might not be able to visualize the potential returns and

therefore not commit to investments due to lack of confidence. Primary objective of predictions is to get rid of the uncertainty associated with a potential outcome.

Two striking (and rivaling) methods have evolved over time: the *fundamental analysis* and the *technical analysis*. *Fundamental analysis* is usually done by economists of business studies that evaluate the influence of economic circumstances on market trends. The utmost requirement for *fundamental analysis* to work is that market participants always have to interpret and enforce given data efficiently. This view of reality leads to the belief in efficient markets. A popular prediction about the target price of a security may turn out to be true. The more challenging question, however, is in what way it will reach this target. There is no point in predicting that the Euro will rise 5 percent against the U.S. dollar in a year, when it initially falls by 10 percent. Financial markets do not move in a linear regression. Short term adverse movements can impact the psyche of a market participant so much that he decides to close out the position halfway through. It requires strong conviction about the eventual outcome and reliance on all other market participants to stick with a position through thick and thin. This approach has several flaws because it assumes that:

- One has included all important factors and assigned accurate weighting to the investment criteria. This is psychologically impossible due to *biased assimilation*.
- If the objective is to invest in “undervalued” companies, one has to evaluate whether the asset’s values are not deteriorating. The market is possibly pricing it in upfront, explaining the low valuation.
- An uptrend is maintained or initiated in the near future to target the fair price. As much as a value investor à la Benjamin Graham welcomes falling prices, an uptrend is still needed to make a profit.

2.2.2 Critique on Technical Analysis

Where *fundamental analysis* lacks, *technical analysis* tries to make up for the shortfall of market timing. Its instruments allow market participants to join momentum flexibly that is expected as a consequence of price patterns. It is expected to work so well because people tend to buy and sell at the same prices again and again. One important requirement for *technical analysis* to work is that supply and demand influences have to unfold extensively. Without sufficient liquidity arising from supply and demand, price action cannot be interpreted accurately enough. Information spreads very quickly so that the advantage of technicians is shrinking. Due to this *information efficiency*, prices adjust with less delay than before because market participants get involved all at once, causing sudden and sharp moves in securities prices.

Even this approach comes with several flaws. Technical analysis merely scratches on the surface because it does not include the current human psyche. A mere numerical observation of charts and trend lines is insufficient to fully understand financial markets. It totally ignores the reasons behind price activity and investors are left in the dark with regards to what they are buying.

- The perceived patterns are subjective and not necessarily what other market participants are seeing.
- Due to ubiquitously accessible information, incoming news is immediately enforced giving patterns less time to evolve. The result is not a *self-fulfilling prophecy*, but a “self-fulfilling destruction”.
- Chart formations are so well known among market participants that they rarely work anymore, often leading to “false breaks”.

3 A History of Irrationality

Financial markets reveal at every moment the way we value assets and the world's resources around us. They are reflections of the human psyche. Like human beings, markets can become depressed but optimism always appears to prevail eventually. Asset bubbles and their bursting are not a novel phenomenon. In the four hundred years since the first stocks were bought and sold in Amsterdam over the Amstel River in 1602,¹⁹ financial bubbles occurred time and again. Prices managed to soar to unsustainable levels only to crash down again, destroying phony wealth that had been built up. Charles Mackay, a Scottish journalist, described the Dutch Tulip Bubble in his book 'Extraordinary Popular Delusions and the Madness of Crowds', first published in 1841:

The first roots were brought from Vienna in 1600 and the tulip's reputation grew from then on until it was seen as proof of bad taste not to grow a collection. A witness of the time described that a single root of the rare species 'Viceroy' was traded in exchange for real assets worth 2500 florins. Among others were: two lasts of rye (558 florins), four lasts of wheat (448), four fat oxen (480), and eight fat swine (240). According to the International Institute of Social History, one florin would have had the purchasing power of 10.28 Euro in 2002.²⁰

More prudent observers began to see that this folly could not last forever. At the height of the mania the roots were seemingly deemed too valuable to risk planting because "rich people no longer bought the flowers to keep them in their gardens, but to sell them again for profit."²¹ The height of the bubble was reached in the winter of 1636–37, when one day in Haarlem, a buyer failed to show up and pay for his purchase. Tulip bulb contract prices collapsed abruptly in panic. Today, the Dutch are still notorious for

¹⁹ Lynch: *Learn to Earn*, p. 23

²⁰ Goldgar: *Tulipmania*, p. 323

²¹ Mackay: *Extraordinary Popular Delusions and the Madness of Crowds*, p. 80

their tulip flowers and this historical event may explain the large tulip gardens of Holland.

An investor who bought the broader market (constituents of a U.S. stock index) at the peak of the 1929 boom would have to wait till November 1954, 25 years, before he got back his initial investment. This is without considering inflation that ate up a generation of currency depreciation. The Roaring Twenties that preceded the crash have been a time of wealth and excess. Similar to how the tulip merchants traded illusions, the investors in the 1920's bought into unsustainable fantasies of easy fortunes. Everyone wanted to be a part of it. Although the stock market crash of Black Monday in 1987 is considered more severe, a full recovery followed sooner. If an investor bought stocks at the 1987 peak, his patience still had to last two years, before markets reached the same level again in 1989.

It is commonly believed that stocks always go up in the long term. Therefore, an investor is expected to make money if he sticks to "solid" stocks through thick and thin, essentially to hold onto them even during a downturn because they are likely to recover eventually. Financial advisers can easily prove the patience's success to their clients by presenting a long-term chart of the performance of stock markets. The Dow Jones Industrial Average has been going up since it was founded by Charles Dow on May 26, 1896 only interrupted by minor downturns in between (figure 4). This is because its constituents are generally the largest corporations of the country and those corporations whose values deteriorated or that went bankrupt, have been replaced by more successful ones.

Companies and economies in their entirety move in cycles. Both have their growing and ultimately fading phases, as the following chapters will show. It is the market as a whole that followed a steady uptrend so far, not necessarily share prices of individual companies. Several occasions will be discussed where holding stocks for the long term

lead to financial disaster. Even holding a diversified portfolio of stocks has caused serious adversity in the past.

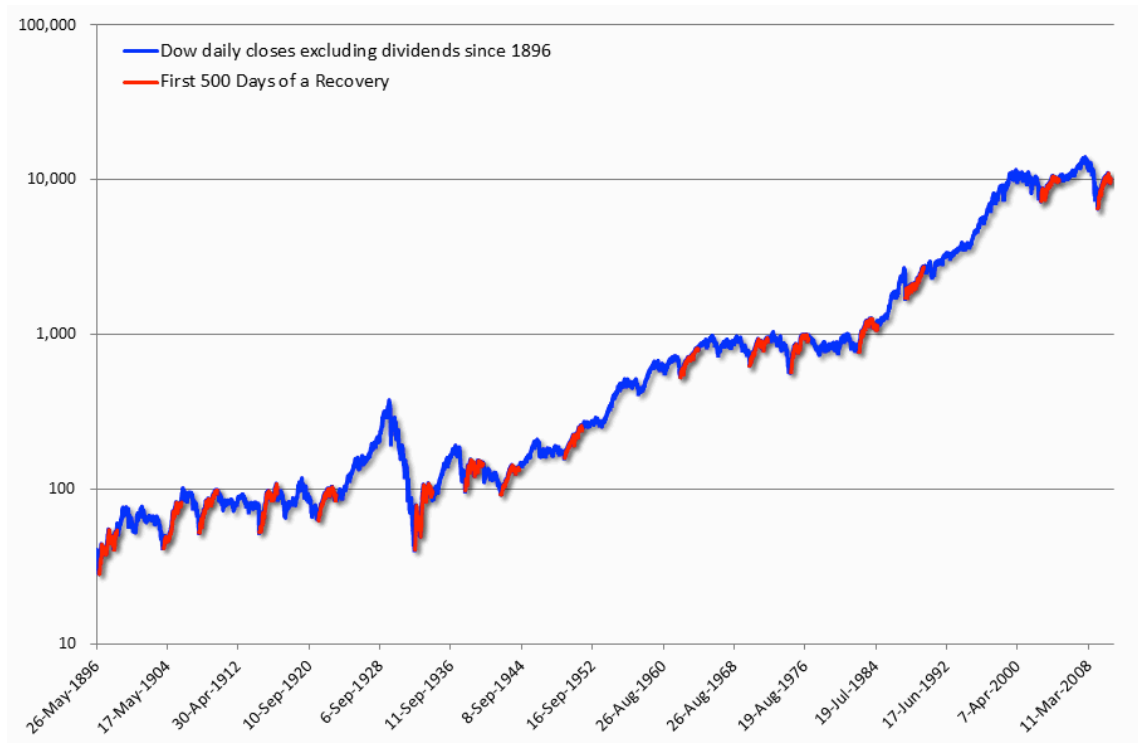


Figure 4. Historical performance of the DJIA since inception in 1896.
Source: <http://dshort.com/charts/Dow/sixteen-recoveries.gif>

3.1 Famous Popular Delusions

3.1.1 Market Crash of 1987

October 19, 1987 is called “Black Monday” in history books. It was the day of the single largest decline in the history of U.S. equity markets in terms of percentage. The Dow Jones Industrial Average declined by almost 23 percent on this day without an apparent catalyst (figure 5).



Figure 5. Source: *Wall Street Journal* "Crash Comparison Chartbook"
http://online.wsj.com/public/resources/documents/info-StockCrash_0710-14.html

Joachim Goldberg, who worked at Deutsche Bank AG for several years as a currency trader, recalled the crash during my interview with him on July 28, 2010 on behalf of Deutsche Börse AG. He told how he owned put options but no one was willing to buy from him at the high levels to which these options had appreciated to that day. He learned that it did not matter if one had the right idea. If there is no market to trade with, it is of no use. Following Black Monday, major stock markets experienced similarly substantial declines globally (see table).²²

	DJIA	FTSE 100	DAX 30	Nikkei 225	Hang Seng
Oct 19	-22.6%	-10.8%	-9.4%	-2.4%	-11.1%
Oct 20		-12.2%	-1.4%	-14.9%	-33.3%*

* To calm investors, Hong Kong reopened only on Monday, October 26, 1987.

Black Monday did not come out of nowhere. As the market opened on October 6, prices began to drop. By the end of the day, a sudden need to sell took hold on investor's agenda. A trader at that time remarked in the *Wall Street Journal*,

²² Some global details of "Black Monday" 1987

“This one really came out of the blue. I didn’t expect it to be so bad [...] we froze around 3 P.M. and just started watching the screens. Even the phones stopped ringing. We were watching history in the making.”²³

Over the next week the market experienced three considerable losses consecutively on October 14, 15, and 16 leading up to the weekend. Up until today, there is little consensus on why Black Monday happened the way it did. Immediately afterward, analysts gave all kinds of explanations for the crash. On the one hand, it can be explained by rational considerations, and on the other hand, the sudden change in market valuations verifies the dominance of psychological factors. Proponents of the *Efficient Market Hypothesis* have the following explanation: Prior to the crash, yields on long-term treasury bonds increased from 9 percent to almost 10.5 percent in two months. Share prices can be very sensitive to minor changes in interest rates. One can generally say that stocks are priced at the present value of future dividends (discounted cash-flow model). For an investor who holds stocks for the long term, he would apply this formula:

$$r = D/P + g$$

where

- r is the rate of return (RoR),
- D/P is the dividend yield (i.e. the dividend divided by the current share price),
- and g is the growth rate.

One assumes that the RoR on government bonds is 9 percent and the premium that investors demand for the additional equity risk is 2 percent, resulting in $r = 11$ percent.

²³ Wall Street Journal, October 7, 1987

If an average stock is expected to grow at $g = 7$ percent and pays a dividend of \$4, the equation would be $0.11 = \$4/P + 0.07$, resulting in $P = \$100$.

Next, one assumes that government bond yields rise from 9 to 10.5 percent and in response, investors demand 2.5 percent premium. The RoR is now 13 percent resulting in $0.13 = \$4/P + 0.07$. In this case, P would be \$66.67 now, a 33 percent decrease.²⁴ Apparently the huge drop had been long due, indicating that markets are not fully efficient at adjusting prices without any delay. After all, yields on the treasuries were public information and on the rise long before the crash. The economist Alan Kirman wonders why the rebalancing act fell on that particular day,

“It is difficult to believe that there could be a sudden change in the fundamentals which would lead agents simultaneously within half a day to view that returns in the future had gone down by over 20 percent. Yet this is what would have to be argued for the October 1987 episode on the world stock markets.”²⁵

Behavioral finance furthermore asserts that there is a psychology to the market, and such panics are one manifestation of it. Black Monday is thus an important piece of evidence against the *Efficient Market Hypothesis*, since valuations did not change rapidly over that period. Technology at that time is said to have contributed to the selloff. It is commonly believed that computer trading exacerbated the drop. Robert Prechter Jr., market analyst known for his financial forecasts using the *Elliot Wave Principle*, argues,

“The crash of 1987 was such a storm of mass emotion that ‘market as machine’ theorists worked overtime explaining the drop and figuring out how to ‘fix’ the system. The theory that gained the most credence was that the crash was caused

²⁴ Malkiel: *The Efficient Market Hypothesis and Its Critics*, pp. 26–27

²⁵ Ormerod: *Butterfly Economics*, p. 16

by so-called portfolio insurance computer programs, which in essence sold stocks as the market went lower. [...] Unfortunately for the theory, it does not explain very well why markets around the world crashed simultaneously or why the decline stopped. It is at an utter loss to explain why many indexes around the world that had no computer trading fell further than the Dow Jones Industrial Index. It also ignores the fact that throughout 1986 and 1987, market observers in an equally serious tone had continually explained why a stock market crash was impossible because of ‘safeguards that are in place’, safeguards such as portfolio insurance.”²⁶

3.1.2 Long-Term Capital Management

Long-Term Capital Management, or LTCM, was a speculative trading firm run by people who were considered geniuses from the highest ranks of academia. The company was started in 1993 by John Meriwether. He used his reputation to recruit several Salomon bond traders and mathematicians. By February 24, 1994 it began trading.²⁷ The ideas of the *Modern Portfolio Theory* inspired trading strategy, until it stopped working as the company went bankrupt in 1998.

Myron Scholes, financial economist, and Fisher Black of Goldman Sachs developed a new theory for pricing options, which later was dubbed as Black-Scholes model. Its formula implies that markets are efficient, which means that stock price movements cannot be predicted and thus returns on a portfolio of stocks follow the well-known bell-curve distribution. Scholes and Black discovered that stocks with low betas gave higher returns than what *CAPM* suggested. Two explanations come to mind: Either *CAPM* was wrong, or the market was inefficient which offered them chances to

²⁶ Prechter: *The Wave Principle of Human Social Behavior*, p. 378

²⁷ Dunbar: *Inventing Money*, p. 142

generate excess return. During the summer of 1998 the Russian financial crisis triggered a number of large events that was beyond their calculation models. Stock markets plunged worldwide while their volatility rose to 49 percent (figure 6).

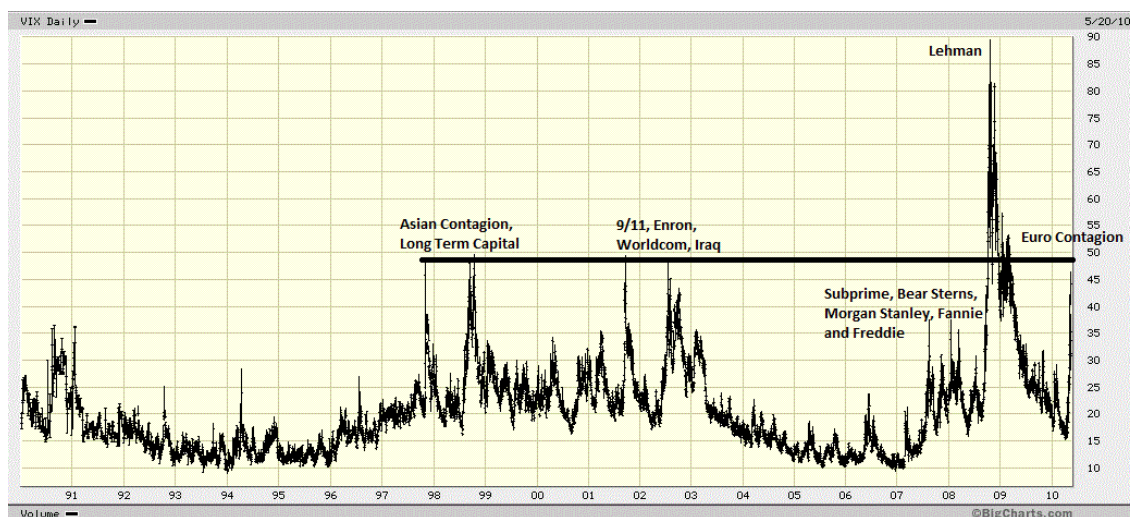


Figure 6. 20 year chart of the volatility index (1990-2010)
 Source: <http://www.ritholtz.com/blog/2010/05/long-term-vix/>

LTCM was heavily leveraged because it did not include such unpredictable outcomes into their models and gradually took on more and more risk. Its exposure had been massive by the time it collapsed. The founding partners claimed that LTCM was unlikely to lose more than \$45 million in a single day.²⁸ In fact it lost \$550 million on that Friday August 21, 1998. The fund's value at risk (VaR) models assumed that the loss in August was so unlikely that it ought to have never happened. A reason for this assumption was because LTCM was basing its model on the data of the previous five years where markets were in a calm uptrend. Had they captured eleven years, they would have integrated the 1987 crash and perhaps developed their models accordingly.

When markets were shaken, all correlations among financial instruments shifted to become positively correlated. The protections supposedly offered through hedging with options contracts became useless as they did not serve their original purpose anymore.

²⁸ Lowenstein: *When Genius Failed*, p. 149

A few days later, LTCM lost 44 percent of its entire capital, a loss of \$1.8 billion.²⁹ Efficiency as anticipated by the founders seemingly ceased to exist.

3.1.3 Internet Mania of the New Economy

The internet bubble is an ideal example of investors venturing into stock market speculation without any knowledge of financial markets. For behavioralists, this hype is clear evidence of irrationality in markets. Great inflows of funds during the 1990's contributed to an exacerbation of the already strong trend in technology stocks. Funds who receive investor's money need to show performance to retain their trust and are therefore forced to buy stocks. If they fail to perform well, investors would withdraw funds and go elsewhere. Any news about an IPO was cheerfully received. The result was that too much capital went into these industries, dragging the entire market along. William J. Bernstein, financial theorist, points out,

“The April 2000 edition of the Morningstar Principia Pro stock module occupies an honored spot on my hard drive, and from time to time I sift through the names with awe: Terra Networks, selling at 1,200 times *sales*; Akamai Technologies, 3,700 times *sales*; Telocity, 5,200 times *sales*. Not one with *earnings*.”³⁰

One of the most bloated company, Internet Capital Group, deserves being mentioned here. After its initial public offering on August 5, 1999, the share price went from \$6 to \$212 in 2000, only to fall back to becoming a penny stock (figure 7). ICG invested in small business-to-business companies from all over the internet scene. One the same page of his book, Bernstein continues in his satirical language,

²⁹ Perold: Long-Term Capital Management, L.P., p. 1

³⁰ Bernstein: The Four Pillars of Investing, p. 152

“It actually issued *bonds*, which were of the same quality as those issued by my butcher at Safeway, if only the SEC would allow him to do so. The frosting on the cake was that it sold at an estimated ten times the value of the companies it held. So it not only owned just fluff, but was valued at ten times the fluff it held.”

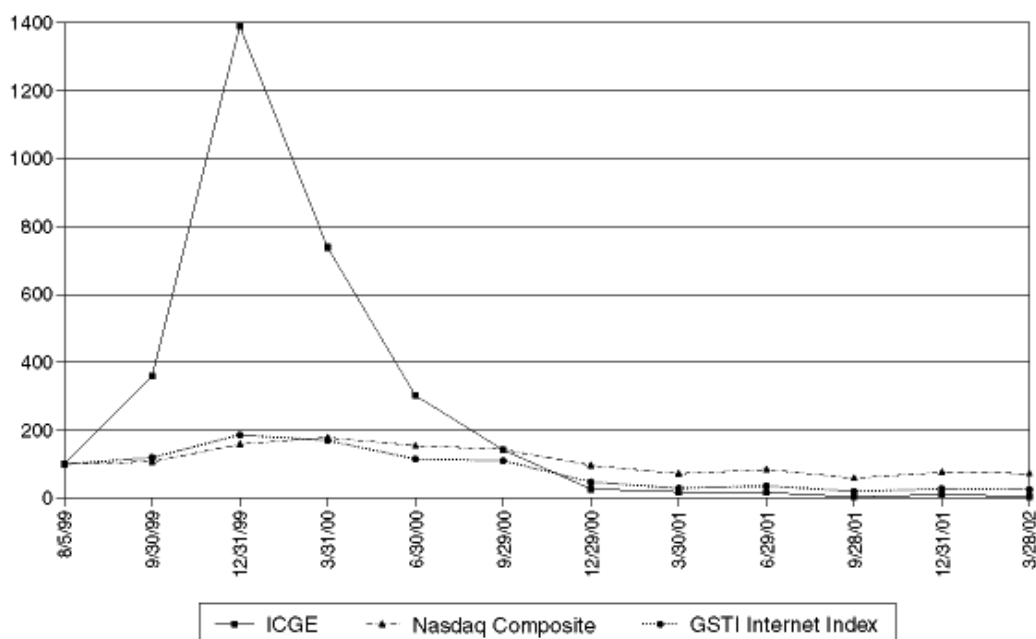


Figure 7. Quarterly closing prices of Internet Capital Group.
Source: SEC, Schedule 14A Proxy Statement, Internet Capital Group, May 6, 2002.

Valuations of equities are based on uncertain expectations of the future. In his speech given at the American Enterprise Institute on December 5, 1996, the former chairman of the Federal Reserve Alan Greenspan famously titled it “irrational exuberance” when stock market prices rally upwards in a collective euphoria. Perhaps the prices are justified if the expected prospects turn out to be true. George Soros, currency speculator and philanthropist, finds the exuberance not irrational at all. “When I see a bubble forming I rush in to buy, adding fuel to the fire. That is not irrational.” Instead, he recommends that we need regulators to prevent a bubble in growing too big because we cannot fully rely on market participants.³¹ His recommendation is supported by Joseph Stiglitz, economist and professor at Columbia University, who claims that the current

³¹ Soros: Financial Markets, p. 33

financial crisis occurred precisely out of the belief that markets were self-regulatory and self-corrective. This caused politics to withdraw regulations gradually over the years.

Once the sentiment shifts from greed to fear, the bubble caused by this euphoria can burst with unexpected rapidity. Market participants who bought into this bubble are likely to regret their investments which are now mostly penny stocks of insolvent companies without any hope for recovery. An excuse that some investors used when asked about their reluctance to cut losses early, is due to the public belief that stocks always go up, claiming they were “in for the long run”. Unfortunately, this is a misconception because it is the general market which recovered time and again and not necessarily individual stocks.

3.2 Unavoidable Boom & Bust Cycles

One wonders how it must have been like to live in such a time. After the internet bubble, this generation knows too well. Popular beliefs exacerbate nonrational behavior among market participants even more. Financial markets suffer from frequent disequilibrium in the form of so-called “business cycles”. These cycles involve swings between optimism and pessimism in popular sentiment which, in turn, lead to the formation of irrationally high or low collective expectations. The swings of public mood are observed in stock price movements commonly known as bull and bear markets. The movements of the financial market are not as smooth as economic sciences would like. As long as expectations of the future swing from over-optimistic to over-pessimistic, markets will be “moody”. Once unexpected catastrophes occur, the carefully devised formulas of pure logic will stop working, such as what happened to LTCM.

Martin Hüfner, chief economist at Assenagon Asset Management in Munich agrees that the neoclassical models which assume perfect individual rationality do not work in financial markets because they disregard herding effects. In my interview with him on

August 6, 2010, he quoted the former CEO and chairman of Citigroup, Charles Prince, “As long as the music is playing, you’ve got to get up and dance”³², so it will be very difficult to fight or even reverse the sentiment. Optimism continues much longer than everyone anticipates. It is as John Maynard Keynes, British economist, once observed that “markets can remain irrational longer than you can remain solvent.”³³ Some events disrupt equilibrium more than others and certain ones trigger total collapse. There seems to be a *critical state* in which one decision of a market participant can influence the decisions of all others. This is a reason for why we need to examine the relevance of herding and crowd psychology in financial markets.

³² Citi Chief on Buyouts: ‘We’re Still Dancing’

³³ Lowenstein: When Genius Failed, p. 123

4 Examining Individual and Crowd Behavior

Carl von Clausewitz, German military theorist and Prussian soldier during the Napoleonic Wars, defined war as follows, “We shall keep to the element of the thing itself, to a duel. War is nothing but a duel on an extensive scale.”³⁴ The basic form of a market is where two individuals gather to do trade. It is therefore reasonable to begin with analyzing the elements of a market, its individual participants. From an economic point of view, rationality is given if two criteria are satisfied:

1. The actions of market participants need to be logically conclusive
2. Trading decisions must lead to increase of economic well-being

Particularly the latter criteria is not always granted. Lack of financial knowledge prevents people from making decisions that serve their interests best. I claimed earlier that market participants try to beat time by picking a financial instrument with the most promising risk and return proposition. The ideal ratio where people take the gamble is questioned. Daniel Kahneman, professor of Psychology at Princeton University, summarized the following experiment,

“If you ask, let's say Princeton students, how about a gamble, where if it shows tails, you lose \$10. If it shows heads you win X dollars. What would X have to be before you like to gamble, before you're willing to take it. They'd want \$25. You can do the same thing with their parents and talk \$1,000 or \$10,000 and you'll get roughly the same ratio. So that's a very fundamental fact about people, that they're loss averse.”³⁵

³⁴ von Clausewitz: On War, p. 75

³⁵ Your Mind and Your Money

Besides making money, an additional subconscious objective can be the seek for excitement and entertainment that leads people to the financial market. Objectives can skew rationality. One may enter a position for “fundamental” reasons, but decide to abandon it out of fear. Nonrational decisions are a result of insufficient certainty about the future. Investors rush in to exacerbate a bubble in the hope to not miss out great gains and sell in fear of encountering higher losses than the investors are willing to take.

History taught that a downturn can last as long as a whole generation (Great Depression). So by selling out the position, the investor is actually doing market timing because he hopes that he can avoid this adverse effect and reinvest his money at a later date. When an average investor goes to work for 25 years in an attempt to increase the living standard for his family and suddenly sees his life’s savings deteriorating because LTCM went bankrupt, one cannot expect him to react rationally in such an environment. Even more importantly, one million market participants working in tandem will find it difficult to make efficient decisions within the same system.

4.1 Arguments Against Individual Rationality

4.1.1 Uncertainty Environments and the Asch Experiment

The Asch conformity experiment, led by Solomon Asch in the 1950s, studies the conformity of individuals in groups. Groups of students have been asked to participate in a vision test whereby one of the participants was acting (confederate) and it was actually about how the remaining students would react to the confederates’ answers. A sample question is which of the three given lines was longer compared to the reference (figure 8). The students had to tell their answers out loud while the confederate would announce his in advance, providing correct answers at first to avoid suspicion.

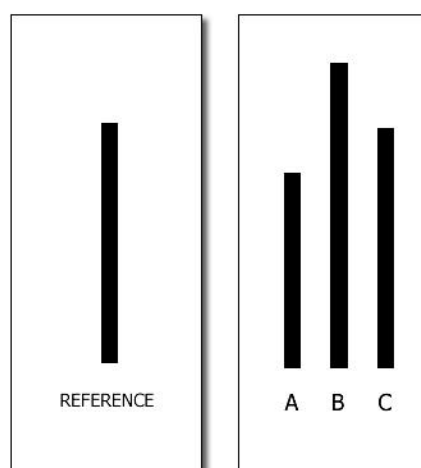


Figure 8: A replication of the cards used during the experiment. The card on the left is for reference, the one on the right shows the comparison lines.

After a few rounds of giving the correct answer, the confederate changed tactics and started to provide incorrect ones. Since the study group has no pressure to conform to a single wrong answer, rarely they would follow along and give a wrong answer too. But as soon as the number of confederates rises within the group and collectively give the incorrect answer, the students would start to conform and provide incorrect responses on a high proportion of the questions. The conclusion is that one confederate has virtually no influence to impose conformity, whereas the tendency to conform rises with each additional confederate. It indicates that there must be a tendency of individuals to prefer following the crowd despite having a different opinion.

Applied to the financial market, this would result in investors following a trend out of conformity although they might be of a contrary opinion. The current market price is given and the individual has little influence for changing it. Therefore, most individuals assume that its valuations must be correct. Even if markets were efficient, market participants still join due to what is being currently observed (e.g. a strong uptrend), rather than basing their investment decision on their own judgment of a fair price. One might counter that the investor can create his independent opinion by escaping into a quiet attic to do research. While in its essence it is possible to come up with an

independent opinion. The difficulty, however, is that one cannot control the market's price. It is given and one has to conform or pass on an opportunity. Asch's experiment could be the first hint for nonrational decision-making by market participants. To prove the case, the next chapters will examine the individual's behavior in more detail.

4.1.2 Basic Financial Choices

The objective of a decision is to control the future. Making an educated guess can be of help, but this comes only with appropriate education about financial issues. Even this requirement seems to stay unfulfilled for many, which is why they have nothing more than their gut feeling. The problem already begins at school where classes teaching economics or finance are basically non-existent. Merely 7 percent of 1,001 respondents of a survey said they learned about personal finance in school. A majority of 40 percent learned from parents or at home, followed by 15 percent who taught themselves.³⁶ This reveals that knowledge about finance remains at the discretion of one's own interests to learn or not (figure 9).

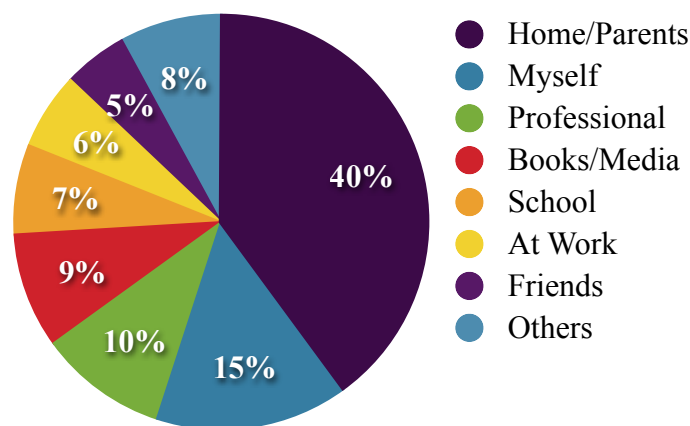


Figure 9. Learning about finance seems not mandatory.

³⁶ 2008 Financial Literacy Survey, p. 10

The dilemma continues in college, although the situation improves when compared to high school. In one survey conducted by Lewis Mandell, professor of finance at the University of Buffalo School of Management, a group of 1,030 college students scored just 62 percent in a set of questions about personal finance and economics.³⁷ Only 19 percent understood that stocks would tend to generate a higher return over eighteen years than a U.S. government savings bond. Less than 6 guessed that inflation can cause the most difficulties for people living on fixed retirement income.

This phenomenon is not restricted to Americans. In 2006, the UK Financial Services Authority carried out a survey of public financial literacy which revealed that 21 percent of the 5,328 correspondents did not know what the effect of an inflation rate of 5 percent and an interest rate of 3 percent would have on the purchasing power of their savings. One tenth did not know which the better discount was for a television originally priced at 250 pounds: 30 pounds or 10 percent.³⁸ These sample questions are of very basic nature. The failure to answer them properly leaves reason to assume that a significant number of individuals cannot manage their finances rationally, let alone make rational decisions in the financial market. One has to assume that a great percentage of market participants is not investing based on own conviction.

4.1.3 Fallacious Appeal to Authority

The next best thing the investor would do is to seek up expert advice once his limit of competence is reached. If the investor cannot handle his own emotions, then there must be an objective source of information that can guide him professionally. One likes to listen to so-called experts and believe their projections. Frederick Winslow Taylor, who was a mechanical engineer and is regarded as the father of scientific management,

³⁷ 2008 Survey of Personal Financial Literacy Among College Students

³⁸ Atkinson; McKay; Kempson; Collard: Levels of Financial Capability in the UK, pp. 120–121

recommended that specialization would increase efficiency, what Adam Smith originally coined as “division of labor.”³⁹ One does not go to medical school as soon as one is faced with a big health problem. It is certainly more convenient and possibly safer to consult an expert in this field. Doctors in turn listen to their financial adviser on how to allocate their wealth. People have the spontaneous tendency to trust an expert with whom the result is more immediate. Moreover, to mitigate a bad decision, advice of third parties is often taken into consideration with an unconscious desire to shove off responsibility. If something wrong happens, at least it is not one’s own mistake.

The *appeal to authority* is a fallacy where a statement is regarded as correct because the statement is made by a source that is regarded as authority. It generally has the following form:

1. Person A makes claim C about subject S.
2. Person A is authoritative on subject S.
3. Therefore, C is true.

Conducting financial analysis for securities is said to require sophisticated tools, as well as expertise and experience to evaluate the potential risk and return of investments. To collect commissions for expert advice, there is a natural incentive to portray financial analysis as something very complicated to the average investor. Since financial experts are expected to know their subject well, one simply agrees to and acts according to their recommendations. John Maynard Keynes once hypothesized about the correct ways an investor should behave in a rational manner:⁴⁰

1. “We assume that the present is a much more serviceable guide to the future than a candid examination of past experience would show it to have been hitherto. In

³⁹ Smith: *The Wealth of Nations*, p. 4 ff.

⁴⁰ Keynes: *The Quarterly Journal of Economics*, p. 114

other words we largely ignore the prospect of future changes about the actual character of which we know nothing.

2. We assume that the existing state of opinion as expressed in prices and the character of existing output is based on a correct summing up of future prospects.
3. Knowing that our own individual judgment is worthless, we endeavor to fall back on the judgment of the rest of the world which is perhaps better informed. That is, we endeavor to conform with the behavior of the majority of the average.”

Due to the fact that one has no perfect knowledge, individuals tend to trust opinions of others to seek orientation which results in herding. The third point of Keynes leads us to another reason for the instability of financial markets. Human behavior has an innate tendency to swing from depression to euphoria and back again. All financial institutions follow this inclination which derives from our failure to learn from past mistakes, or as the Spanish-American philosopher George Santayana famously said, “Those who cannot remember the past are condemned to repeat it.”⁴¹

4.2 Crowd Psychology

4.2.1 The Mind and Herding of Crowds

Although one might expect that crowds behave similarly to individuals, it is not the case. A crowd actually assumes its own personality. If enough individuals come together to form a crowd and thereby have a collective agenda, then we can speak of crowd psychology. People who are coincidentally at the same place without an objective do not make a crowd in psychological terms. A crowd acquires a new collective soul which is very different from the individual’s conscious mind. Its actions will also be beyond an individual’s understanding. The social psychologist Gustave Le Bon spoke of “loi de

⁴¹ Santayana: Reason in Common Sense, p. 284

l'unité mentale des foules"⁴² (law of the mental unity of crowds). When being an element of the crowd, one loses its individuality and can get mesmerized by the crowd's soul. In financial markets, individual participants are enthralled and lured into decisions that they otherwise would not have made if they were independent from the crowd. This reminds of the *Milgram Experiment*, whereby a candidate hurts a confederate with electrical shocks under higher command. With an *appeal to authority*, they hand over responsibility and blindly execute what they are told to do, although they realize that the confederate is suffering pain with each increase of voltage.

One speaks of rallies and slumps when the media tries to give markets a "mood". Since one's mood can influence another, markets seem to be naturally organized where swings can be magnified out of proportions. Theoretically, participants merely gather to do trade with the common goal to make a profit, but crowd psychology is an inevitable factor that is being unduly ignored. Bernard Baruch, financier and stock market speculator, once said,

"All economic movements, by their very nature are motivated by crowd psychology. Graphs and business ratios are, of course, indispensable in our groping efforts to find dependable rules to guide us in our present world of alarms. Without due recognition of crowd-thinking (which often seems crowd-madness) our theories of economics leave much to be desired. It is a force wholly impalpable – perhaps little amenable to analysis and less to guidance – and yet, knowledge of it is necessary to right judgment on passing events."⁴³

As a result, trying to predict the movements of the market can be truly impossible because a change in the mood of a single market participant can trigger an avalanche of consequences that influence the moods of almost all other participants. The actions of

⁴² Le Bon: *Psychologie der Massen*, p. 10

⁴³ Menschel: *Markets, mobs, and mayhem*, p. 37

an individual can influence the decision-making of others. Even though a crowd is involved in a market, misleading actions can perpetuate so that other individuals do not necessarily serve as a corrective element anymore. In direct conflict with the *Efficient Market Hypothesis*, large price changes seem to result from a *critical state* in markets and its unleashing is inevitable from time to time even if no modification in fundamentals triggered them.

4.2.2 Smarter Than the Individual

By crowding, the mass as a whole does not become smarter but more mediocre. It can only represent average skills of an individual at most because exceptional skills of an individual are averaged out in the crowd.⁴⁴ Yet, the average is what produces the most accurate outcomes on a consistent basis. The phenomenon which proved the wisdom of crowds first emerged in the 1920's when sociologist Kate Gordon conducted a simple experiment with her students: 200 students were asked to rank a handful of items by weight. Then she simply calculated the average of all answers and found out that the result was 94 percent accurate.⁴⁵ Today, we can observe collective wisdom in the weekly television show "Who wants to be a Millionaire?". If the contestant is confronted with a question he is unable to answer, he may choose to poll the studio audience to help him out. At first, one might not assume that asking a randomly composed group of people without expertise on the topic will produce a more desirable outcome than consulting an expert. But these people, who do not even know each other, collectively manage to pick the correct answer 91 percent of the time.⁴⁶

⁴⁴ Le Bon: *Psychologie der Massen*, p. 15

⁴⁵ Grötter: *Brand Eins* (October 2005), p. 114

⁴⁶ Surowiecki: *The Wisdom of Crowds*, p. 4

With these remarkable results, one should assume that market participants as a whole can find a proper price with high accuracy, thus supporting the theory of efficient markets. If the crowd happens to be wrong, it will be a huge mistake. The primary reason is that market participants rely on each other by taking the current price as reference and can therefore exacerbate movements based on false assumptions. An interesting event happened in America in the 19th century when entrepreneurs wanted to profit from the boom in wooden pavements for covering muddy roads. Within a few years, over a thousand businesses were founded to specialize in building these pavements. High profitability was expected based on a false assumption that these wooden roads would last up to twelve years. In fact, they rot after four years already and rendered this whole venture unprofitable. These businesses vanished as quickly as they emerged.⁴⁷ If everyone relies on what others say, it is a rational behavior but also a dangerous one because it causes bubbles that will eventually burst.

4.2.3 Even Experts Follow the Crowd

Analysts tend to align each other's predictions. It will be difficult to pick the odd analyst who did not conform to the majority. As I experienced during my internship with Deutsche Börse AG, regular surveys are conducted in cooperation with Cognitrend GmbH that involves 300 institutional investors and analysts to analyze the outlook for the German DAX. Every Wednesday the following question will be asked: Whether the market will be trading higher, lower, or unchanged in the upcoming four weeks. Cognitrend will then calculate an average index, called the Bull/Bear index (figure 10) to capture the current sentiment.

⁴⁷ Grötter: Brand Eins (October 2005), p. 119

Institutional investors in the survey appear to have picked tops and bottoms before the trend actually started to reverse (February, May, or June) and most of the times they merely conformed. In other words, the majority of experts pursued a reactive approach.

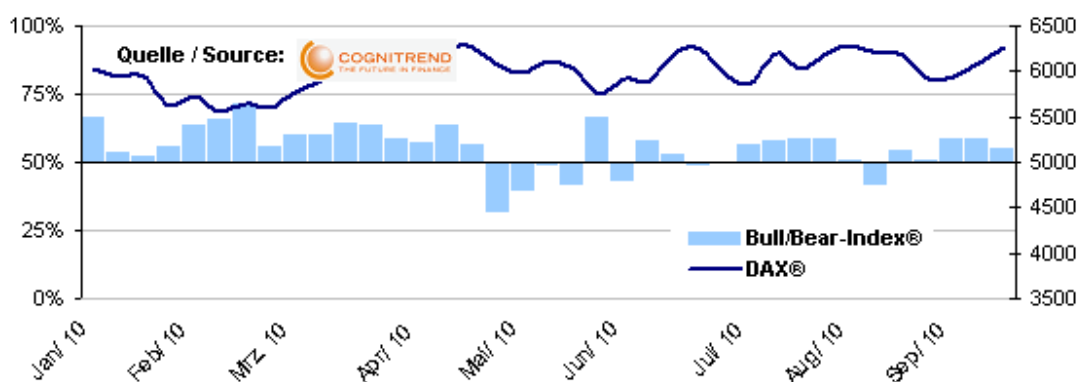


Figure 10. Börse Frankfurt Bull/Bear Index
<http://www.boerse-frankfurt.de/DE/index.aspx?pageID=185> (Date accessed: September 15, 2010)

The National Association of Active Investment Managers (NAAIM) has been collecting sentiment data of roughly 40 active money managers since 2006. Also on Wednesdays, a survey about their overall exposure in the equities market is performed:

- 200 percent: leveraged short
- 100 percent: fully short
- 0 to 100 percent cash: hedged to market neutral
- 100 percent: fully invested
- 200 percent: leveraged long

It appears that the members of this survey also pursue a rather reactive than an anticipating approach to market trends (figure 11). That is very common behavior of market participants, whether they are retail or institutional, and it shows that markets are not predictable even to professionals with more sophisticated tools. The Survey of Manager Sentiment by NAAIM is a useful addition to the Bull/Bear index by Deutsche

Börse because it shows to what extent professional money managers are actually deploying money. Despite that, one has to regard the numbers critically, since the sample size is not large enough to reflect actual market conditions.

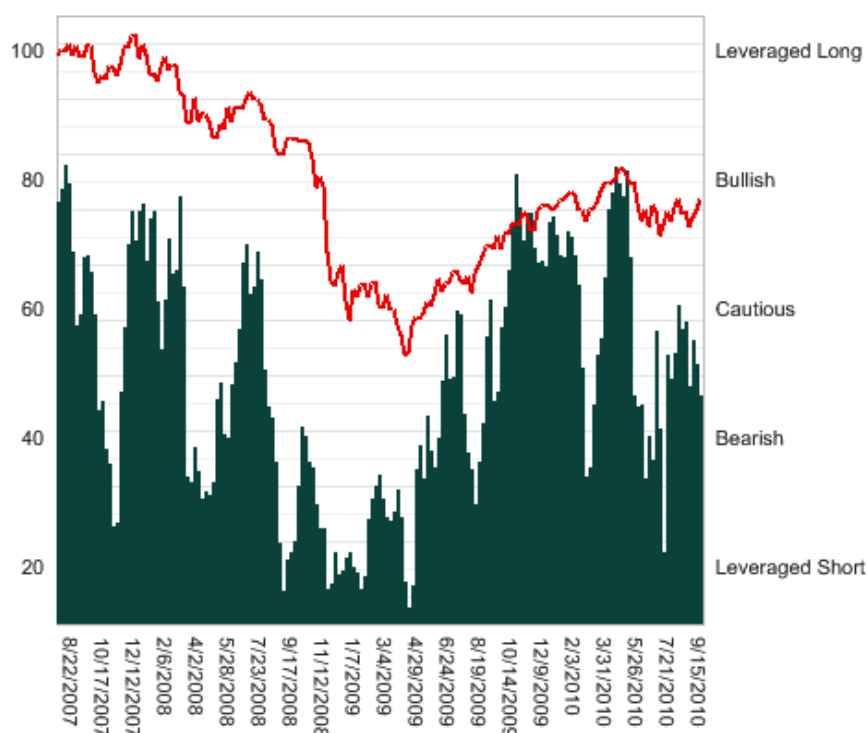


Figure 11. The NAIM Survey of Manager Sentiment
<http://www.naim.org/naaimadsenttrend.aspx> (Date accessed: September 15, 2010)

4.3 Handling the Future

4.3.1 Why Do We Predict?

One may wonder why we put efforts in drawing out future scenarios and attempt to be as accurate as possible. In order to make rational decisions, dependable economic forecasts are necessary. Governments, labor unions, employers and also banks and financial service providers ask for more precise scenarios at an increasing pace, says

Ullrich Heilemann, who is professor for empirical economic studies at the University of Leipzig.⁴⁸ Economic scientists join this game because all other forecasters are in it, too. Competition is intense. The answer also lies in human nature itself. Our consciousness makes us plan because we want to be mentally (or physically) prepared for potential consequences. The philosopher Daniel Dennett promoted the idea that the most potent use of the brain is precisely an ability to extrapolate current events into the future. It is to mitigate first-order natural selection. Having different scenarios in mind, gives us the opportunity to decide which actions to take in reality. For Dennett, brains are “anticipation machines”.⁴⁹ So there seems to be an evolutionary dimension to project scenarios into the future.

It would be preferable if explanations of market movements are as simple as possible. The market goes up because oil goes down, media tells, even though it went up for another reason. With an explanation one feels that one knows something. The behavioral psychologists note that this state actually releases chemicals in the brain that makes one feel good. The simple explanation is already satisfying, although one intuitively knows that things are far more complicated than that. As philosopher Friedrich Nietzsche noted, dealing with the unknown can be disturbing. So one looks for the simpler explanation.

“To trace something unknown back to something known is alleviating, soothing, gratifying and gives moreover a feeling of power. Danger, disquiet, anxiety attend the unknown – the first instinct is to *eliminate* these distressing states. First principle: any explanation is better than none. The cause-creating drive is thus conditioned and excited by the feeling of fear.”⁵⁰

⁴⁸ Geld & Leben

⁴⁹ Dennett: *Consciousness Explained*, p. 177

⁵⁰ Owen: *Nietzsche, politics and modernity*, p. 91

To put it in other words, it is quite irrelevant for the chemical release whether the fact is correct. Predictions give the feeling of comfort and safety. One just needs a reason to avoid fearing the future.

4.3.2 Economists are Useless at Forecasting

Perhaps, the gut feeling helps in predictions. We are not educated to rely on intuition but are required to back our conclusions with hard facts. Especially when concerning potential investment opportunities in a company, one needs to prepare precise pro forma balance sheets which merely project current circumstances into the future anyway. Gerd Gigerenzer, professor at the Max Planck Institute in Berlin, asserts that simple and intuitive methods such as finding a “good reason” can lead to faster and more accurate results.⁵¹ More information or more sophisticated software does not necessarily help. In fact, only 28 percent of 2,207 recently surveyed executives claim that the quality of strategic decisions in their companies were good.⁵² According to Gigerenzer, companies are not judging more based on good reason because companies complicate their research efforts. The problem lies in selling their product to the public. If only intuition was used instead of expensive expertise, then the customers could obviously invest the money themselves. The majority of economics is about applying common sense, but it is deliberately made complicated.

During normal times, economic forecasts are helpful as they can be accurate for a time span of about one year. They are of no use when times are rough, such as during the current financial crisis (figure 12). Exogenous shocks with sudden events such as a chain reaction of bankruptcies were one of those dynamics predicted by very few.

⁵¹ Gigerenzer: Gut Feelings, p. 151

⁵² Lovallo; Sibony: The case for behavioral strategy, p. 3

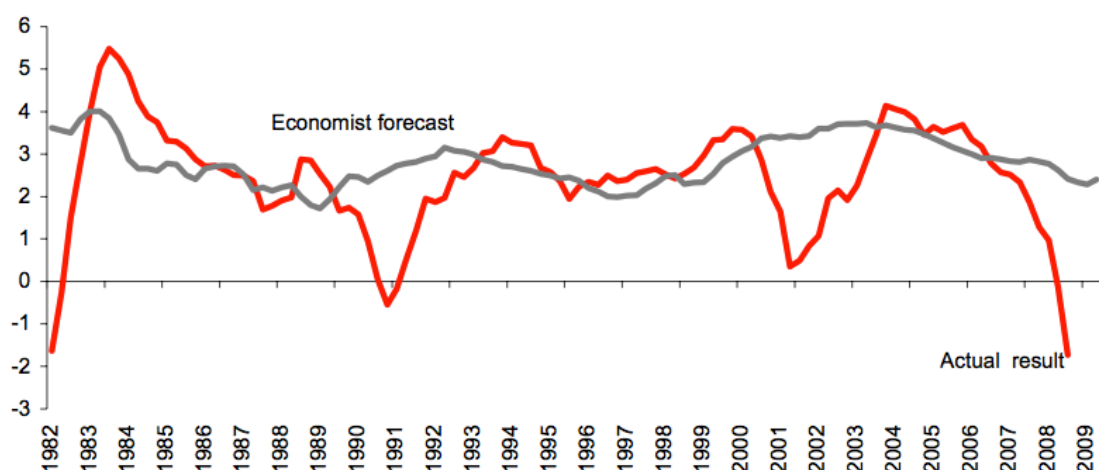


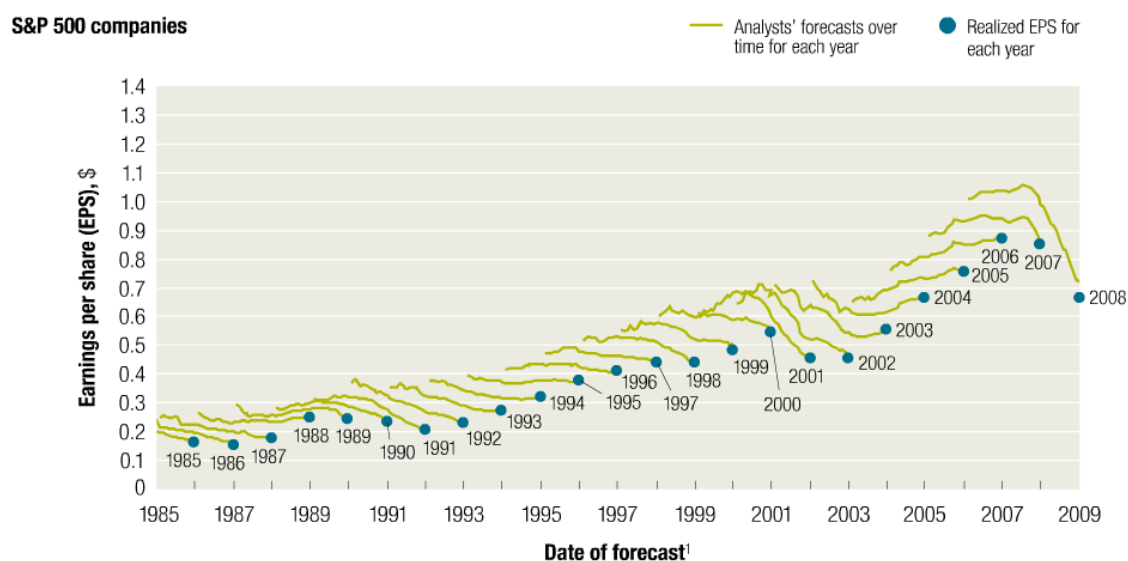
Figure 12. U.S. GDP in percentage.
Source: Société Générale Global Strategy

Forecasters can be very mistaken. Jeffrey A. Frankel, professor of Economics at the Kennedy School of Government at Harvard, confirms that he does not think that they “as a profession, ever had an ability to forecast recessions. It’s hard enough to know when a recession has started, looking at it with hindsight.”⁵³ Neither he nor the many members of his profession have a particularly good record of forecasting recessions. Predicting the future and every consequence of decisions accurately is simply beyond human capabilities.

Historically, analysts typically “lag behind events in revising their forecasts to reflect new economic conditions.” A McKinsey study found that analyst forecasts are too bullish in good times, and too bearish during downturns. Actual earnings from S&P 500 companies only “occasionally coincide with the analysts’ forecasts.”⁵⁴ As the chart below shows, most of the time analysts are collectively twice as bullish as actual (e.g. they expect earnings growth of 10 to 12 percent, compared to actual earnings growth of 6 percent, figure 13).

⁵³ Gross: The Forecast for the Forecasters Is Dismal

⁵⁴ McKinsey on Finance, p. 16



¹Monthly forecasts.

Figure 13. Source: Thomsen Reuters I/B/E/S Global Aggregates; McKinsey analysis

4.3.3 Biased Assimilation

Human beings can only handle a certain amount of information. This limitation leads to a filtering effect which leaves out pieces of information and weighs it according to subjective importance. Information can be understood completely differently according to the theory of *biased assimilation*. Several investment mistakes are made because we hear what we want to hear.

For example, a group of people were asked to read various studies that advocate or discourage the death sentence. Half of the group was for capital punishment and the other half was against it. They were also asked to rate the studies in terms of the impact they had on their views on capital punishment. Those who had an advocative stance, found that the studies that supported the death penalty were well-argued and the others had very weak points. The other group provided the exact opposite conclusion.⁵⁵ With *biased assimilation* one is actually more polarized than before.

⁵⁵ Montier: The Little Book of Behavioral Investing, p. 99

Gerd Bosbach, professor for Statistics at the University of Koblenz, tells about his observation at the German Federal Statistical Office how politicians pick those forecasts that meet their current needs for their project best. Because politicians will usually receive a number of forecasts from different institutions, they can easily find numbers that support their agenda.⁵⁶ Forecasts concern the future and the future is always undefined. Bosbach therefore warns that we must not succumb into believing all claims. To expect a carefully calculated future to become true is naive. Yet, a *hindsight bias* tends to prevail when one sees past events as being predictable – in hindsight. In case it does happen as predicted, one has to understand that it was most likely pure luck. The more analysts try to predict the future, the higher chances are that one gets it right.

⁵⁶ Geld & Leben

5 Appropriate Market Models

Advocators of behavioral finance are gaining increasingly popular votes, even more so in light of the financial crisis. Market participants cannot base their decisions on knowledge but have to anticipate the future which only evolves with the decisions made in the present. To speculate correctly one would need to know the decisions of all other market participants and their consequences. Therefore the financial market is unlike a microeconomic environment where perfect knowledge is basically given. Theories such as the *Efficient Market Hypothesis* emerged to circumvent imperfect knowledge and assume immediate price adjustment to all information available. Securities prices are never constant. Financial markets do not act like microeconomic markets with an equilibrium where everyone is satisfied with one price and where it does not fluctuate much anymore once it is reached. Relative valuations change throughout the day. Behavioral finance describes intuitive, empirical observation of investment decisions and puts this knowledge into market models. As discussed in previous chapters, it is a topic which experts agree has to be taken into consideration.

Barry Ritholtz, Chief Market Strategist for an institutional research firm, said “We use everything that we know works. Macroeconomics, technicals, fundamentals, valuation, quantitative – it all goes into the mix.” He does not understand why people limit themselves to just one discipline. “The value guys never look at technicals, the fundamental analysts ignore macro cycles. It creates blind spots in their analyses. When we go over other research reports, they are obvious to see.”⁵⁷ Commodity Trading Advisors (CTA) that utilize *trend following* through Managed Futures Accounts have long known that there is no Holy Grail in investing. When following trends, they know that anything can happen so they have completely abandoned concepts such as *fundamental analysis* or simple *buy-and-hold* strategies. Many successful trend followers and CTAs have developed trend following systems based on multiple time

⁵⁷ Mauldin: A Closer Look at the Second Leg Down in Housing

frames with the objective to harness the trend that herding generates in the market. In order to do that, their primary focus lies in managing risk so that the return would somehow take care of itself. Whenever they engage themselves in a trade, the potential loss is always known upfront.

Behavioral finance has documented some of the investor biases explaining the rationale for *trend following*:⁵⁸

- **Anchoring bias:** Tendency to rely too heavily on one piece of information, specifically the recent price history to estimate “fair-value”.
- **Bandwagon effect and feedback trading:** Tendency for traders to act as a group and jump on the bandwagon of a rising price trend (herding).
- **Confirmation bias:** People tend to look for information supporting their beliefs and consider recent price moves to be representative of future prices. This leads investors to over-allocate funds to markets having already risen and under-allocate to fallen markets. This behavior favors trend continuation.
- **Overreaction:** Market participants overreact to new information, creating larger-than-warranted effects on market price and stronger trends.

These biases explain why prices always move around the equilibrium and evolve in trends. The trend following industry therefore analyzes trends on a meta-level according to the *Dow Theory* (higher highs and higher lows for an uptrend, or lower lows and lower highs for a downtrend). Practitioners understand that the crowd is always collectively smarter and therefore do not bother to predict or outsmart the market. Instead, their goal is to participate in the crowd’s wisdom.

⁵⁸ Liberty: A quantitative look at Trend Following

5.1 Behavioral Finance

5.1.1 Market Sentiment Analysis

Crowd psychology dominates in financial markets which is why both *fundamental analysis* and *technical analysis* (either alone or combined) can be very challenging propositions in determining accurate and objective price predictions. Market participants behave differently on an individual level because their attitude toward risk, objective, or thinking can vary greatly. It is natural to make mistakes but mistakes cause emotions, which in turn can lead to irrational decision-making and shape future decisions.

A behavioral analysis oriented theory has evolved as a new study field which is called *behavioral finance*. It deals with the reception, selection, and processing of information that lead to a decision. However, this study assumes that human beings can only act rationally in a limited way. This idea initially emerged in 1957 with sociologist and psychologist Herbert Simon, who termed it “bounded rationality”.⁵⁹ Given alternatives do not necessarily offer an obvious outcome with easily quantified probabilities which is why human beings opt for the alternative that is satisfying, but not necessarily optimal in economic sense. *Behavioral finance* tries to predict market movements through observation of psychological mechanisms. It is about the actual and often intuitive behavior of market participants. According to the theory, market participants have possibly more motives than merely making money such as the search for excitement. Furthermore, it does not imply that they are acting based on perfect knowledge.

Dan Lovallo and Olivier Sibony at McKinsey have composed a thorough list of common cognitive biases which psychologists identified:⁶⁰

⁵⁹ Selten: What is Bounded Rationality?, pp. 13–14

⁶⁰ Lovallo; Sibony: The Case for Behavioral Strategy, pp. 15–16

<p>Action-oriented biases:</p> <p>Taking actions rather carelessly.</p>	<ul style="list-style-type: none"> • Excessive optimism: Investors tend to be too optimistic concerning future outcomes and underestimate negative ones. • Overconfidence: Own skills are overestimated, giving a feeling of control about the future. • Competitor neglect: Decide on one's own, without minding reactions from competitors.
<p>Pattern recognition biases:</p> <p>Recognize patterns where there are actually none.</p>	<ul style="list-style-type: none"> • Confirmation bias: Giving more weight to indicators that support one's belief and underweight others. • Management by example: Decisions based on recent or memorable examples. • False analogies: Comparing with situations that are not directly comparable.
<p>Stability biases:</p> <p>Wish for things to remain the same during uncertainty.</p>	<ul style="list-style-type: none"> • Loss Aversion: Losses are felt more acutely than the same amount of gains. • Sunk-cost fallacy: Focusing too much on past and non-recoverable losses for future decisions. • Status quo bias: Unwillingness to give up on the once attained status quo, leading to decisions for how to get there again fast.

Joachim Goldberg, an expert in this field, identified the following five behavioral biases⁶¹ of an investor's psychological profile that distinguish the real human beings from the *homo oeconomicus* of neoclassical economic theory:

⁶¹ Goldberg: Behavioral Finance, p. 170 ff

- **Application of heuristics:** The market participant invests little time in digesting all information. Information that is readily available is usually most influential, which leads to suboptimal decisions. Furthermore he thinks in patterns (stereotypes) that filter information according to his current needs.
- **Relative valuation:** Success or failure of a trade is based on the individual entry price instead of objective market events. One tends to take larger risk by letting losses run or averaging into the position to improve the original entry price, whereas gains are taken quickly.
- **Cognitive dissonance:** It is difficult to admit mistakes which is why the participant seeks information that support his decision (rationalization). One finds additional reasons to justify a bad decision.
- **Illusion of control:** Especially after a row of successes, the participant overestimates his skills and believes to control the situation.
- **Phenomenons of lost control:** There is a need to control the risk of a position and therefore a desire to be well-informed. It can be rather stressful when one cannot control the situation. One feels to be at the mercy of the market.

5.1.2 Prospect Theory

With the help of the *Prospect Theory*, behavioral biases that have been ignored by advocators of perfect rationality are made more transparent. These patterns occur when discipline and self-control are overshadowed by emotions, thus giving the market participant an “illusion of control”. The *Prospect Theory* describes decisions between alternatives that involve risk. It can be very well applied to participants of financial markets because information tends to be regarded differently in light of gains or losses, than with a neutral position.

The founding fathers of *behavioral finance*, Amos Tversky and Daniel Kahneman, produced a collection of research outlining the challenges and biases that can occur

when human nature collides with decisions about money. With an experiment they demonstrate the tendency of people to miscalculate probabilities when confronted with basic financial choices. A sample group was given 1,000 Israeli pounds each and were then offered a choice between:

- a) 50 percent chance of winning an additional 1,000 or
- b) 100 percent chance of winning an additional 500 pounds.

The majority of 86 percent chose b) which seems plausible. Afterwards the same group was asked to imagine it was 2,000 Israeli pounds each that they received and given another choice:

- a) 50 percent chance of losing 1,000 pounds or
- b) 100 percent chance of losing 500 pounds.

In this round, the majority of 69 percent actually went for a), although the risk is greater and the outcome identical: one has a 50 percent chance of ending up with either 1,000 or 2,000 pounds (choice a) or one definitely ends up with 1,500 pounds (choice b).

Have been given 1,000 pounds. Can choose between:	
a) Take a risk: 50% chance to get 1,000 more 50% chance to get 0 more	b) Play it safe: 100% chance to get 500 more
Have been given 2,000 pounds. Can choose between:	
a) Take a risk: 50% chance to lose 1,000 50% chance to lose 0	b) Play it safe: 100% chance to lose 500

Tversky and Kahneman's conclusion is that a loss has about two and a half times the impact of a profit.⁶² One fears risk if the prospect appears to be positive and one tends to increase risk if the prospect is expected to be negative. This anomaly in the case of gains or losses is referred to as *reflection effect* where the more risky alternative is preferred. In a misguided attempt to save money, one actually takes *more* risk at times. One seems to have a really hard time at thinking in absolute terms but instead intuitively thinks in relative terms, by doing *mental accounting*. In the experiment it was the question of whether the individual was going to own more, or own less than before. The direction plays a great role which leads to the following two human biases:

1. **Relativity**: judging based on where one started with and
2. **Loss-Aversion**: hostility toward things that go negative.

5.1.3 Genetic Loss-Aversion

Individuals actually make different decisions although the choices given are entirely identical. The brain has various mechanisms which are leftovers of past ages that can cause conflicts, says Jonathan Cohen, professor for Psychology at Princeton University.⁶³ These conflicts between the mechanisms may explain why market participants sometimes show irrational behavior.

An unusual study, reported in the Proceedings of the National Academy of Sciences, explains why people are afraid to lose money. It offers insight into economic behavior and claims that human beings learned to be aware of the prospect of losing food or other valuable possessions. A so-called "*loss-aversion*" makes people avoid risks even if they could earn a significantly higher gain. For example, a gamble in which people are

⁶² *Econometrica* (March 1979), p. 273

⁶³ *Your Mind and Your Money*

equally likely to lose \$10 or win \$15 is one that they would avoid. Furthermore, the study analyzed two women having a genetic condition named Urbach-Wiethe disease whereby the amygdala (an almond-shaped part of the brain that controls fear and other acute emotions) is damaged. The women's answers were compared to those of twelve volunteers without this disease. All volunteers could gamble on an equal chance for a \$20 win or a \$5 loss (a risk most people would take), or win or lose \$20 (one most would reject). The women with a damaged amygdala readily risked a \$50 pot.⁶⁴ This study indicates why people have different risk perceptions. The same thing applies to financial decisions. If a market participant sees his stock portfolio dropping in value, he is only able to see this in old evolutionary terms. Therefore, the two biases *relativity* and *loss-aversion* are inherent and very difficult to overcome.

Individual circumstances are one reason why we cannot assume that all market participants will act rationally and predictably. Laurie Santos, professor for Psychology at Yale University, studied the actions of a simple economy with monkeys and discovers that human beings are far less sophisticated than they think. Santos taught monkeys how to use a currency (a plain metal coin) to trade for food. She went on to create a marketplace where the monkeys can exchange coins for food and her results resembled exactly that of Tversky and Kahneman's. Her conclusion for overcoming these limitations best is to accept that one can and will be wrong.

5.2 Adaptive Markets Hypothesis

Behavioral finance shows that people are biased and tend to make irrational decisions that involve money. In response to the obvious lacks found in the *Efficient Market Hypothesis*, Andrew Lo, professor of Finance at the Massachusetts Institute of Technology, proposed a hypothesis that incorporates behavioral biases. With his

⁶⁴ O'Callaghan: Study shows why it is so scary to lose money

Adaptive Markets Hypothesis, the conventional theories can coexist alongside behavioral models to ease the conflicts between rationality and human psychology. It describes the Darwinian principles in evolutionary biology such as competition, mutation, reproduction, and natural selection. In adaptive markets, investors learn to behave according to how it is beneficial for their own survival.

“If the environment remains stable for long periods, we’ll end up with heuristics that are appropriate for that environment. If the environment shifts, certain heuristics may no longer be helpful. Those who adapt to the new environment by developing a better set of heuristics will prosper and be more likely to pass on those adaptations to subsequent generations.”⁶⁵

Lo argues that market participants make decisions based on past experiences that have lead to satisfactory (but not necessarily optimal) outcomes. Participants are grouped into several distinguishable species whose common behavior will resolve into the reflected market price:

“By species, I mean distinct groups of market participants, each behaving in a common manner. For example, pension funds may be considered one species; retail investors, another; marketmakers, a third; and hedge-fund managers, a fourth. If multiple species (or the members of a single highly populous species) are competing for rather scarce resources within a single market, that market is likely to be highly efficient, e.g., the market for 10-Year US Treasury Notes, which reflects most relevant information very quickly indeed. If, on the other hand, a small number of species are competing for rather abundant resources in a given market, that market will be less efficient, e.g., the market for oil paintings from the Italian Renaissance.”

⁶⁵ Lo: *Survival of the Richest*

His point is that the more market participants are involved at competing for the “scarce” shares of stock, the more efficient a market will become at finding an accurate price. The *Adaptive Markets Hypothesis* presents the following implications that differentiate it from the traditional theory:⁶⁶

1. **Risk and reward relations do not remain stable.** They are dependent on external factors such as the regulatory environment or tax laws.
2. **Arbitrage opportunities do exist.** The attempts made in the financial industry are primarily due to such incentives that are presented from time to time. As old strategies die out, new strategies emerge to reap them.
3. **Investment strategies perform better or worse in different market environments.** A strategy can be out of favor for several years until a friendlier environment allows it to strive again.
4. **Innovation is the key to survival.** One needs to adapt to changing market conditions constantly to attain a stable rate of return.
5. **Survival is the only goal.** Maximization of profits and utility are secondary objectives to the investor.

The market experts who have been interviewed, share the common opinion that investors make mistakes and that these mistakes can provide arbitrage opportunities arising from misinterpreted news items. But as more and more market participants harness such inefficiencies, less return will be generated with such strategies causing them to fall out of favor until they become successful again. The main point of the *Adaptive Markets Hypothesis* might be that everything in the financial market moves in business cycles in which opportunities come and go, and that one needs to adapt to changing market conditions.

⁶⁶ Lo: *The Adaptive Markets Hypothesis*, pp. 21–24

5.3 Theory of Reflexivity

Behind all market movements lies the simple driving force of human beings influencing each other. George Soros is an advocate of the relevance of reflexivity to economics, first introducing it publicly in 1987.⁶⁷ His *Theory of Reflexivity* derives from the claim that market participants are actively involved and not just observers. Thus, it is impossible to make decisions based on knowledge alone. The amount of information that would have to be processed is practically infinite. To reach an objective standpoint, a problem that would need to be overcome is *biased assimilation*. This theory deviates from the theory of efficient markets where market participants have no influence on the asset's underlying fundamentals.

“Reflexivity asserts that prices do in fact influence the fundamentals and that these newly-influenced set of fundamentals then proceed to change expectations, thus influencing prices; the process continues in a self-reinforcing pattern. Because the pattern is self-reinforcing, markets tend towards disequilibrium. Sooner or later they reach a point where the sentiment is reversed and negative expectations become self-reinforcing in the downward direction, thereby explaining the familiar pattern of boom and bust cycles”⁶⁸

To illustrate this reinforcement, one can assume an originally neutral market sentiment where investors react positively on a news item of a company. The prices rise slightly which attract the attention of more investors who also collectively buy more than they sell, causing more upsurge. Optimism rises even within the company because the managers see their actions supported by the market. Such feelings are contagious, which is why a small trigger can reinforce until a whole society is affected.

⁶⁷ Soros: *The Alchemy of Finance*, pp. 25–27

⁶⁸ Soros: *The New Paradigm for Financial Markets*, p. 66

One should bring up the example of Wikipedia. Clay Shirky, consultant and teacher on social and economic effects, explains in his book why the Wikipedia system has become so efficient at producing accurate articles.⁶⁹ An article about “asphalt” was created in March 2001 which originally did not contain more than a simple sentence. Once this article was created, it attracted readers and soon they started contributing more text and references, or corrected each other’s mistakes. Wikipedia’s system relies on the simple concept of *division of labor*. None of those individuals were required to know everything about asphalt, but yet an extensive article about this topic has been built up over time. A very similar phenomenon appears to take place in financial markets, where market participants observe and reflect on a given price to collectively influence it, which in turn influences the perception of the underlying company or market. A self-reinforcing power. The market is seen as a dynamic process, not an end result.

⁶⁹ Shirky: Here Comes Everybody, p. 118

Conclusion

All conventional ideas have been questioned especially in light of the current financial crisis. If we were to take Gustave Le Bon's analysis about the crowd's mind at heart, we would become aware that the average is only mediocre in its intelligence, but also more consistently accurate than the individual. Therefore, applying common sense can already lead to very desirable outcomes. We need to accept that one cannot predict the future with accuracy because several important factors will always be neglected and trust the market in being right more often than not.

In theory, the efficient market models are surely worth pondering about and can work during calm economic times. Empiric tests that support unpredictability of markets could not invalidate the *Efficient Market Hypothesis*. Their long-term practical relevance need to be questioned, though. Economic sciences have to consider a greater amount of psychology in their models because one would then expect crashes on a regular basis as they are a natural phenomenon of human behavior. Unfortunately, the conventional methods leave no place for such volatility, in fact, regard them as so rare that they are negligible. Based on the interviews with many professionals in the industry, behavioral economics is now mainstream and an awareness is rising that herding plays a major role in financial markets. Therefore, the idea of perfect rationality among market participants is rejected. Cognitive biases can skew rationality. Every individual becomes aware of them when actively involved in financial markets. Insights about the vulnerability of human psychology need to be shared in academics more by adjusting the teaching in business classes to this reality sufficiently.

Moreover, the new models need to suggest appropriate risk management techniques to address adverse movements. The *Modern Portfolio Theory* is redundant because it does not protect investors from crises in which correlations are suddenly becoming positive. *Trend following* offers a very inspiring approach that should be taken into consideration.

Statistically, it is seen that the *Random Walk Theory* has its merits. Observation of shorter time frames proves that the next movement cannot be forecast. However, this conclusion is more than obvious. The good news is that it does not need to be forecast in order to make a profit. The *Chaos Theory* points to *self-similar* patterns that can be observed in the bigger picture. It will present a much smoother picture of how markets are evolving if one looks at the broader trend. *Trend following* is elegant because it is unbiased in terms of predicting future movements but harnesses them as they are given by the market.

Supply and demand can find the best price only if there is enough liquidity in terms of trading volume. As long as considerable liquidity is given, markets will tend to be near to efficiency. Market participants must be aware that every investment comes with a risk and need to be sufficiently consulted in this regard. It is their own responsibility if they lose money from time to time. Believing that markets always go up and that there is no risk due to scientific methods is naive. In fact, markets move in cycles and they tend to overvalue and undervalue assets.

Falling prices are not an adverse movement but help to find a reasonable price if the market went too high in the first place. Instead, this adjustment should be embraced because lower prices are actually offering a compelling opportunity to the potential investor. With the right tools that are available to the retail investor nowadays, even a downtrend can be exploited through short-selling. Regulations that discourage trading (including short-selling) are not desirable because they pull out liquidity and henceforth reduce efficiency in finding a fair price. Those market participants who sold short must buy it back at a later date and will create demand where the investor believes is the fair price, thus contributing to efficiency in financial markets. To phrase it differently, a short-selling order today is a buy order tomorrow, or as financier Daniel Drew said it best, "He that sells what isn't hisn, Must buy it back or go to prison"⁷⁰. Supply and

⁷⁰ Geisst: Wall Street, p. 35

demand effects continue to play out perfectly and financial markets must be allowed to freely price assets without intervention.

Max Planck is paraphrased as “science advances one funeral at a time”. It is about time for a new breed of economists who welcome theories that take human interaction into consideration that eventually find implementation in today’s business class. The financial crisis is the paramount trigger to a new way of seeing how societies really work. Barry Ritholtz suggested to use all analytical tools (fundamental, technical, behavioral, etc.) combined to make a sound judgment, while a “good reason” can already justify an investment and lead to better performance. In summary one could devise a framework with the following findings:

- The more market participants are involved at enforcing decisions with buying and selling orders, the more efficient markets tend to become at finding a fair price.
- The market in aggregate is neither significantly smarter nor dumber, but more consistently accurate than experts.
- Seeking confirmation among peers provides more comfort than going against the crowd. This contributes to a herding effect and a trend which can last longer than what analysts anticipate. In some cases, bubbles are the consequence that are not seen as bubbles at the time.
- Markets incorporate a *critical state* in which one decision of a market participant can influence the decisions of all others. A small toppling can suddenly trigger an avalanche of selloffs.
- It is impossible to act perfectly rational because of how the brain is hard-wired. The experiments done by Tversky and Kahneman undermine this conclusion.
- Behavioral biases that obviously skew a rational decision need to be considered which is why the *Adaptive Markets Hypothesis* offers the ideal hybrid of perfect rationality and human psychology.

- Investors reflect on a price, base their trading decision on it, and in turn collectively and indirectly influence the fundamentals of the asset which again influences the price (*reflexivity*).
- Diversification is not the solution for reducing risk because all correlations tend to be positive during turmoils. One needs to know the risk of an investment in advance and cut the position or hedge against it.
- Everything in this world follows a trend. Be it in nature, societies, or financial markets. If one is able to identify trends, one will be in the position to make more rational decisions leading to more satisfying results.

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Bonn, den 30. September 2010

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